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ABSTRACT

This interdisciplinary unit is designed to familiarize students with their heritage of ships and their importance today. Each lesson deals with a different ship type. Following each lecture or reading, a series of suggested multidisciplinary activities are suggested. These are intended as a basis for teacher or student modification or addition. The unit provides a brief history of shipping as it affected New England, relates folklore and traditions stemming from shipping history, discusses power sources for each vessel, and relates nautical poetry and literature to specific events in shipping history. The unit deals with modern concepts and considerations of shipping. (Author/RE)

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ED164352

Northern New England Marine Education Project

College of Education

University of Maine at Orono

Orono, Maine

OUR HERITAGE OF SHIPS

A Marine Education Infusion Unit

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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SE 026 341

Northern New England Marine Education Project

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Orono, Maine

Acknowledgements

This unit was prepared and trial tested in schools in Maine and New Hampshire during spring 1978. Each of the units in this Marine Education Program were trial tested in a minimum of five classrooms and were revised as a result of suggestions by the cooperating teachers. Parts of these units and much of our working philosophy was derived from project C.O.A.S.T. developed at the University of Delaware and we gratefully acknowledge the leadership of Dr. Robert Stegner, director of project C.O.A.S.T. These materials were trial tested under the supervision of former assistant director Dr. Les Picker and were written by graduate students in education at the University of Maine (Orono) and cooperating teachers in the schools of Union, Maine; Freeport, Maine; and Hampton, New Hampshire. We call these units - trial units - because we hope you will try them in your classroom and modify them to suit your situation.

John W. Butzow
Project Director
January 1979

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NORTHERN NEW ENGLAND MARINE EDUCATION PROJECT

ANNOTATED LIST OF INFUSION UNITS: K-8

Trial Edition A

K — Clams and Other Critters: a unit on shells (living and non-living). Includes crafts, science, language arts, home economics, math and other areas (Butzow and Jones)

K + 1 — Marine Art: art and craft activities to be used in many subject areas (Picker)

2 — The Aquarium: revolves around a freshwater aquarium setup. Language arts, math, science, art and others. (Kilfoyle)

3 — The Beaver: study of the history, economics and natural history of the beaver. Social studies, language arts, music, arts, crafts, science, math (DiSilvestro)

4 — The Lobster: explores the economics, history, biology, literature of the lobster. Home economics, art, crafts, science, social studies, literature (Kilfoyle)

5 — Whales and Whaling: a complete study of the history, biology and economics of whales and whaling. Language arts, music, math, science, social studies, arts, crafts, industrial arts (Picker, Carkin)

6 — Our Heritage of Ships: surveys the development of ships, with emphasis on New England. Science, art, music, crafts, literature, language arts, social studies (Glueck, Butzow)

7 — Ships, Shipping and Waterways: explores ships and seaways today, with emphasis on New England. Social studies with excursions into science, arts (Glueck, Butzow)

8 — Coastal Indians of Northern New England: three part approach to Indian studies, culminating in an "Indian Day or Evening." Independent study suggested for Part II. Language arts, library science, music, art, crafts, social studies, marine science, industrial arts. (Picker, DiSilvestro)

Units are available from:
Northern New England Marine Education Project
Shibles Hall, College of Education
University of Maine at Orono
Orono, Maine 04469

2a

TITLE: Our Heritage of Ships

GRADE LEVEL(S): 6 (can be used 5 through 8)

SUBJECTS: social studies, music, art, science, language arts, math

CLASS PERIODS: various (5-20)

AUTHOR: Glueck (1978)

Some Teachers' Comment on

Our Heritage of Ships:

Team teaching was very successful in the aspect that students received the historical and scientific approach.

Most of the activities were good. It's nice to have that many to choose from.

Some children elected to make mock birch bark canoes. Good reaction by children.

Instead of using beef bones for mock scrimshaw, we used plaster of paris for base. Terrific reaction!

With no gym, a school yard full of snow and no block and tackle, we pantomined the chanty Heave Away! This was enjoyable and successful.

The museum trip was a terrific success!

LIST OF DRAWINGS

Figure 1. Log & Man

Figure 2. Canoe parts

Figure 3. Viking Boat

Figure 4. Half Section of British Vessel (circa 1780)

Figure 5. Overhead of Privateer Advertisement

Figure 6. Frigate "Constitution"

Figure 7. Half Section of Whaler

Figure 8. Tea Clipper under Sail

Figure 9. "Thomas W. Lawson"

Figure 10. Rigging of Ships

Figure 11. Types of Commercial Atlantic Fishes

Figure 12. Coastal Steamer "Penobscot"

Figure 13. Walking Beam Instructions

The drawings are provided in the Appendix for your convenience. You may copy them for use as student handouts, overhead projection transparencies, or bulletin board displays.

LIST OF SLIDES*

Slide 1. Indians fishing from a dugout

Slide 2. Viking ship relic

Slide 3. Santa Maria II

Slide 4. Santa Maria II decks

Slide 5. English Merchant Ship (circa 1600)

Slide 6. "Great Eastern"

Slide 7. U.S.S. "Constitution"

Slide 8. Whalers "Charles W. Morgan" and "Wanderer" at anchor

Slide 9. Whaleboat being towed by a whale

Slide 10. Clipper "Glory of the Seas" being built

Slide 11. Clippers at anchor

Slide 12. Downeast "Mertie Crowley"

Slide 13. Downeaster "Thomas W. Lawson"

Slide 14. "Cora Cressey" (Downeaster hulk)

Slide 15. Friendship sloop "Olive E."

Slide 16. Grand Banks Schooners

Slide 17. Grand Banks Schooner at speed

Slide 18. Coastal Walking Beam Steamer "State of Maine"

Slide 19. Coastal Steamer (propeller driven) "New Hampshire"

Slide 20. Lobster boat in port

Slide 21. Herring seiners

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*Those slides are not included with the Our Heritage of Ships unit. They are available from the Instructional Systems Center, University of Maine at Orono, Orono, ME 04469. Request the slide unit "Our Heritage of Ships". There is a minimal charge for handling and postage.

INSTRUCTIONAL OBJECTIVES

Upon completion of this unit students will be able to:

1. Give a brief history of ships which have affected New England and tell where they could be found.
2. Relate folklore and traditions stemming from the ship studies.
3. Discuss the type of power source used for each vessel.
4. Relate nautical poetry and literature to specific events in shipping history.
5. Identify four different types of sailing ships using mast and sail arrangements as guides.
6. Be able to describe a primitive marine steam engine and tell how it operated.
7. Describe the changes in ship design as they relate to the function of the vessel.
8. Name economically important types of commercial fish. If field trips were taken, the students will also be able to:
9. Plan and report on a ferryboat trip; or
10. Describe or reproduce the deck arrangements on board the U.S.S. Constitution, in Boston Harbor.
11. Plan and report on a visit to an available boat.

UNIT TERMINOLOGY

aft: rear direction on ship

beam: breadth of ship

boom: lowest wooden beam used in schooner rigging

bow: forwardmost part of ship

bowsprit: boom extending from bow of vessel

cutwater: where ships bow meets water

davits: small cranes from which lifeboats hang

forecastle: storage area in bow of vessel

mast (main, fore, mizzen): upright vertical poles from which sails hang

port: left (directional)

sheer: horizontal curvature of a ship's deck

spar: crosspiece from which sails hang from masts

starboard: right (directional)

stem: cutwater edge of bow extending from bow sprit to keel

stern: rearmost portion of vessel

yards: spars

windward: side of vessel the wind is hitting

leeward: side of vessel not in path of wind

freeboard: amount of hull between deck and waterline

keel: midline of ship upon which ribs are fastened

oar: long rowing paddle for propelling small craft

TEACHER INTRODUCTION

This unit is designed to familiarize students with our heritage of ships and its importance to us today (see Instructional Objectives). It is intended for the teacher to follow the chronological order, as presented in the unit. However, presentations reflecting teacher's preferences are encouraged.

Each ship type is presented as a separate lesson. Lecture information is given for the teacher to present to the class, or for individual reading. Drawings and slides are synchronized to the test material.

Following each lecture/reading, a series of suggested multi-disciplinary activities/projects are listed. It is not intended for every activity to be done by the class. Teacher or student modification and additions are encouraged.

Since students will be bringing in articles, projects, and reports concerning the various ship types, it is recommended that file folders be set up for future years' use.

Since this is an inter-disciplinary infusion unit, no attempt was made to include an evaluation device for measuring student learning. It is suggested that a test be constructed based on how the unit was used. Objective questions can be drawn from the lecture material content. Questions aimed at reasoning abilities and synthesizing information are most appropriate for this unit. Projects and reports can also be used as a basis for evaluation.

Introduction to Unit:

For thousands of years people all over the world have traded or moved goods over long distances by water transport on either rivers, lakes, or oceans. This is still true today even though the types of boats and the products they carry have dramatically changed over the years. While passengers now rely upon the automobile and airplane for transport to most areas of the world, large freight and fuel cargoes still move most effectively over the waters which cover 4/5 (80%) of the earth's surface.

Lesson 1 Native Boats in North America

Distribute Drawing 1 and 2.

The first boat - The earliest boats were probably simple logs which people held onto for support when crossing a body of water. In order to move their belongings with them, the people had to lash several logs together with vines or reeds which grew near the water's edge. The several logs now formed a floating platform or raft which either drifted on the water current or was pushed by the person. In deeper bodies of water the people pushed against the bottom of the lake or river with long poles while standing on the raft. The method of propulsion remained in the muscles of the person who owned the boat.

American Indians and dugout canoes - American Indians found that by carefully burning just the inside of a large tree trunk and scooping out the ashes, they could make a boat in which they could sit, and which would keep their belongings in one place and dry. Sharp rocks and clam shells were common tools for hollowing out the log. (Slide 1)

The dugout canoe was easier to push or paddle than a raft and much easier to steer. These hollowed tree trunks were very heavy when removed from the water.

The Indians found that birch bark is oily and repells water somewhat. By sewing birch bark around a wooden frame, they created a canoe which was lighter, waterproof, and as long or short as was required by the builder. Many techniques the Indians used to bend wood for the canoe frame and prepare the bark covering are similarly used today to construct small sail and rowboats.

While some Indian canoes were used on the ocean shore to help in fishing, they were generally too fragile to attempt to cross the open ocean and saw use mostly on rivers and lakes.

Activities:

1. If birch trees grow near the school, show them to the class. Caution students not to strip off bark or injure the tree by cutting.

2. Collect naturally occurring tools such as might have been used to carve a dugout canoe. Remember that all such tools must be natural occurring and not forged from iron or steel.

3. Attempt to bend a strip of wood to form a permanent curve such as one might find in the frame of a birch bark canoe. This is sometimes aided by steaming the wood over water containing pieces of oyster shell, which facilitates the process. Try different types of wood and have students chart which works best.

4. Weight or estimate the weight of a tree trunk suitable for a dugout canoe. Estimate the weight of the finished product.

Lesson II Norsemen or Vikings

Distribute Drawing 3

The word "Norsemen" means "men from the North. These men came from what is now Norway and Sweden in Europe and sailed wooden ships across the Atlantic Ocean to this continent. They landed along the coast of Nova Scotia and New England. The Vikings left carvings in stone to show they have been here and proclaim the glorious voyages of their tribes. These are now called the "Runic Stones," and are found from Nova Scotia to Michigan. The Norsemen were excellent sailors who navigated using the sun, moon, and stars to help maintain their course. The boats were called "longships" and were powered by both men rowing and by large, colorful sails.

Recently, archaeologists have discovered the remains of Norse ships in Europe and are learning many details of Viking customs, religion, and shipbuilding techniques. (Slide 2)

The vessels were built of overlapping boards, pegged and nailed together. They often had no decking and the sailors all slept on the open flooring of the hull.

Norsemen did not choose to settle in North America, but scientists believe that they visited here many times, hundreds of years before Christopher Columbus' voyage in 1492.

Activities

1. Obtain several plastic model kits of Viking boats for students to assemble.

2. Tools Brought by the Vikings

Excavations have shown the Vikings to have used iron for their tools and axes, swords and spears, at a time when other armies in the world used metals like copper and brass.

Compare a strip of copper to a strip of iron of similar shape and size.

--Which bends more easily?

--If heated with a torch, which melts first?

--Does one produce a colored flame when heated? Which one?

--Try cutting the iron with the piece of copper. Try cutting the piece of copper with the iron. Which is softer?

--Place both metals in separate jars of salt-water for several days. What forms on each piece? Are there differences in color?

--Place a magnet on both pieces. What do you notice?

--Weigh pieces of the same dimensions. Which is heavier?

Look up these words and see how they apply to what you have discovered: malleable, ductile, oxidation, magnetic, density.

What is a chromatograph? Explain how it is used.

Which metal, copper or iron, would make stronger armor, more durable swords and tools?

Why would a Viking use iron to peg the boards of his ship together instead of copper? Why was the iron covered with tar or tree sap when used on the water?

3. Keeping Afloat

Viking ships were not only long but quite wide. This allowed them to weather high pitched storm waves at sea, and also to carry large numbers of men and equipment. A boat will only stay afloat when its hull pushes away an amount of water that weighs more than the boat and its contents. When the cargo and boat begin to weigh more than the amount of water pushed away, the boat sinks. When a hole is put in the side of a boat, the weight of the amount of water entering sinks the boat.

When a boat floats by pushing away an amount of water from the hull it is called displacement, because the boat displaces the water.

Try this - 1) Using modeling clay, reproduce a small model of a Viking ship. You may wish to use the drawing in the lesson as a guide. Make the hull thin enough to be in scale with the rest of the boat. Be sure the hull is long and wide enough to displace enough water to keep it afloat. 2) Float the model in a shallow pan of water. Begin to fill the hull with paper clips or another weight. 3) After the boat sinks, remove it from the pan and weigh it and its contents. How much does it weigh? 4) Weigh an empty cup. Fill the cup with water so it matches the weight of the boat, but make up the weight which is paper cup by adding that amount of water again to the total. 5) Pour the water into a graduate cylinder. How many milliliters (ml) is this amount of water?

4. Using the Sun For Telling Time

Which direction does the sun rise in? Face that direction. Which is the opposite direction? Where are north and south? Diagram this on a circle with a cross drawn over it.

Where is the sun in the sky at midday?

What happens to shadows as the sun passes overhead?

If a shadow points westward at sunrise, where will it point just before sunset?

5. Project: Building a Sundial

a) Cut a circle 30 centimeters (cm) in diameter out of plywood or heavy cardboard.

b) Cut a right triangle with a long squared edge of 10 centimeters (cm), and a base of 5 centimeters (cm), out of the same material.

c) Fasten the base of the triangle to the exact center of the circle.

d) Place your sundial in an open area where it will have sun all day, and can remain undisturbed.

5) As the sun passes overhead, the shadow of the triangle will change its position on the base. Each daylight hour's shadow casting should be marked on the base with a numeral.

Sundials were an early attempt at a standard measure of time. What happens to the shadow of the triangle as the seasons change? How accurate a measure of time is this? Would you be able to use a sundial at night? Why would this be less useful on the deck of a rolling ship, even with a clear, sunny sky?

Lesson III Christopher Columbus and the New World

When Columbus arrived in the New World, he was looking for a new route to India on behalf of Queen Isabella and King Ferdinand of Spain. Columbus was an Italian navigator who had a theory that the world was round and not continuously flat, as one might guess by looking at the horizon.

The Spanish gave Columbus three small ships called the Nina, the Pinta, and the Santa Maria for the voyage. These were wooden vessels powered by sails, with only 1.5 meters of freeboard. Freeboard is the distance from the ship's main deck to the waterline, measured along the ship's hull.

The ships each had a main deck where the cooking was done, (Slide 3), a hold where cargo was kept and where the sailors slept, and a great cabin, high in the stern of the vessel, where the Captain lived. The hulls were rounded at the extreme ends but had a sharply pointed prow above the waterline. These vessels were manuverable, but tended to be slow due to their bulky hulls. (Slide 4)

Santa Maria was later wrecked on a reef off Haiti, causing Columbus to shift his command to the smaller Nina, Santa Maria measured about 26 meters long, and Nina about 23 meters long.

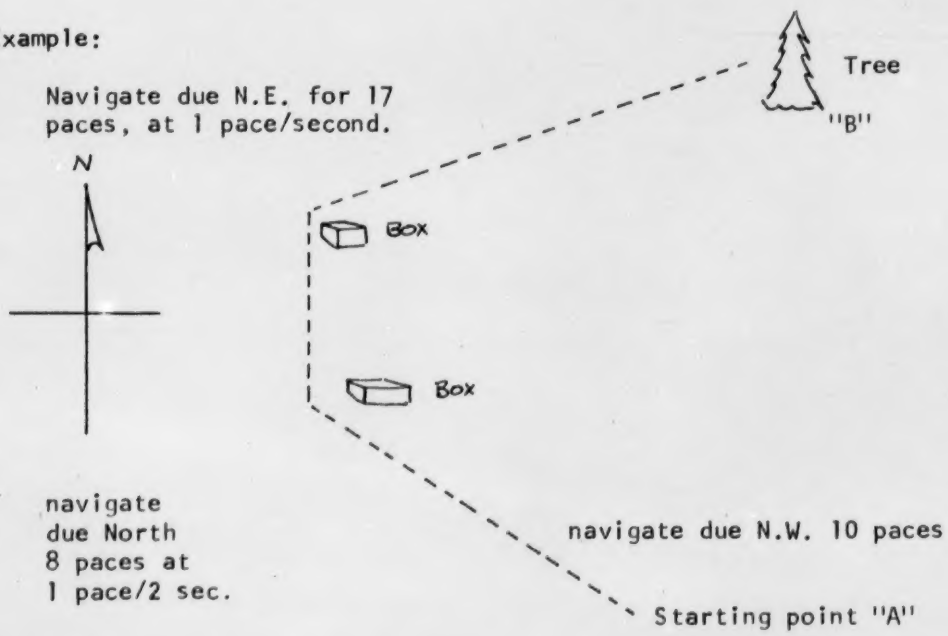
While Columbus actually landed in the Caribbean (nearest to Florida in the U.S.), we remember him as the first white man to establish for explorers, including those who visited New England, that a New World existed. Most importantly, he showed that the New World was accessible without falling off the edge of a flat earth.

Activity

1. Ded. Reckoning: Ded. Reckoning means "Deduced Reckoning" of a position on a chart. This technique has been used since before Columbus to try to ascertain position on a map without the benefit of visual guides. Mariners simply followed a course direction by magnetic compass, and noted the speed at which they were traveling. For instance, a navigator would change his course by the compass after traveling a certain period of time at a certain speed. This method is inaccurate because it does not allow for tidal changes, ocean currents, or wind direction.

   Have children "navigate" a predetermined course, from one point in the school yard to another, looking straight down at the ground, using a watch and a simple magnetic compass to direct them. Have them move at a speed of approximately one pace ($\frac{1}{2}$ meter) every second (or as desired). Make the course indirect, but not hazardous.

Example:



For variations in this exercise:

a. You may wish to prevent outside tell-tale interference from biasing your students by using a paper bag or flight instructor's "hood" to limit peripheral vision.

b. Change the time-piece used, from a watch to a 3 minute sand timer, such as used for cooking eggs. This is what people used before watches.

c. Remember the size of individuals will vary. Therefore, use tall and short students.

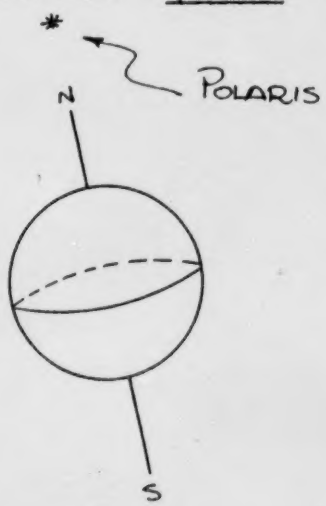
d. Try using more accurate measures, like a trundel wheel to guide the length of paces.

e. Unexpectedly delay the student or alter his direction slightly and have him compensate for the difference.

Relate these experiences to those of early sailors in unknown oceans, in fogs, sailing for months without sight of land, spotting unusual sea animals, fearful of falling off the edge of the world...

2. Celestial Navigation

One of the tools which Columbus used to keep track of his position on the Atlantic was a quadrant. A quadrant measures

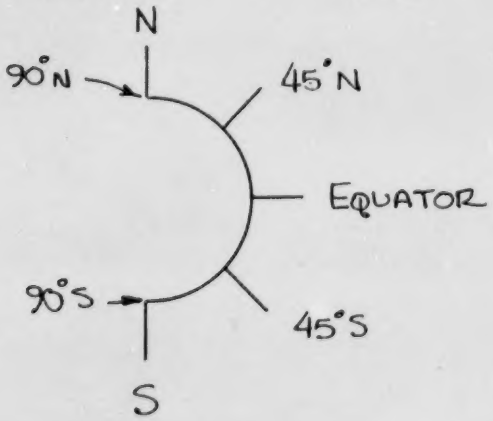


approximate latitude by fixing an angle between the North Star (Polaris) and the center of the earth. A quadrant gets its name from 4 sets of 90° arcs in a single great circle about the earth. Since the center of gravity does not change positions and the position of the North Star does not vary appreciably, the angle as sighted is determined by the position of the ship. The greater the angle as measured off the North Star, the closer the vessel is to the North Pole. Degrees of latitude are measured in increasing increments from the equator north. The equator is 0° latitude, while the North Pole is 90° latitude. Each degree of latitude is subdivided into smaller units of 60 minutes (60'). In southern latitudes the degrees of latitude increase towards the South Pole.

Instructions for constructing a quadrant are found on the next page. Here are some approximate latitudes for some Maine and New Hampshire cities:

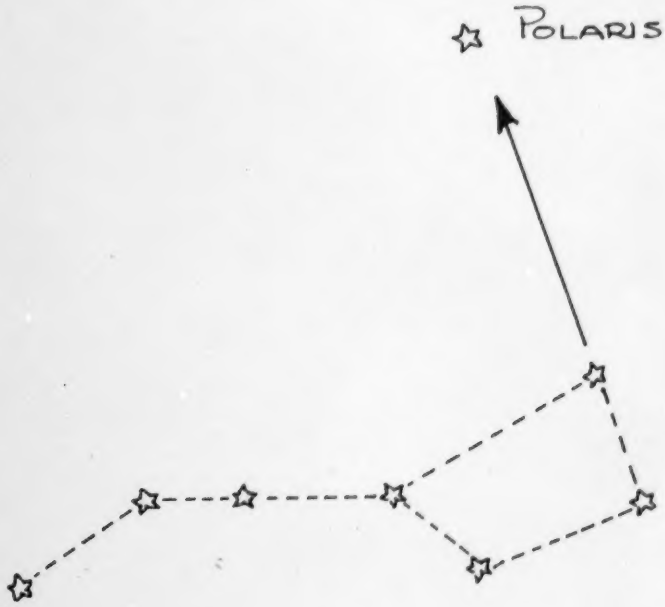
NH	POSITION
Colebrook	44°54'
N. Conway	44°0'
Hanover	43°45'
Laconia	43°30'
Concord	43°09'
Portsmouth	43°05'
Hampton	42°50'
Manchester	42°50'
Nashus	42°45'

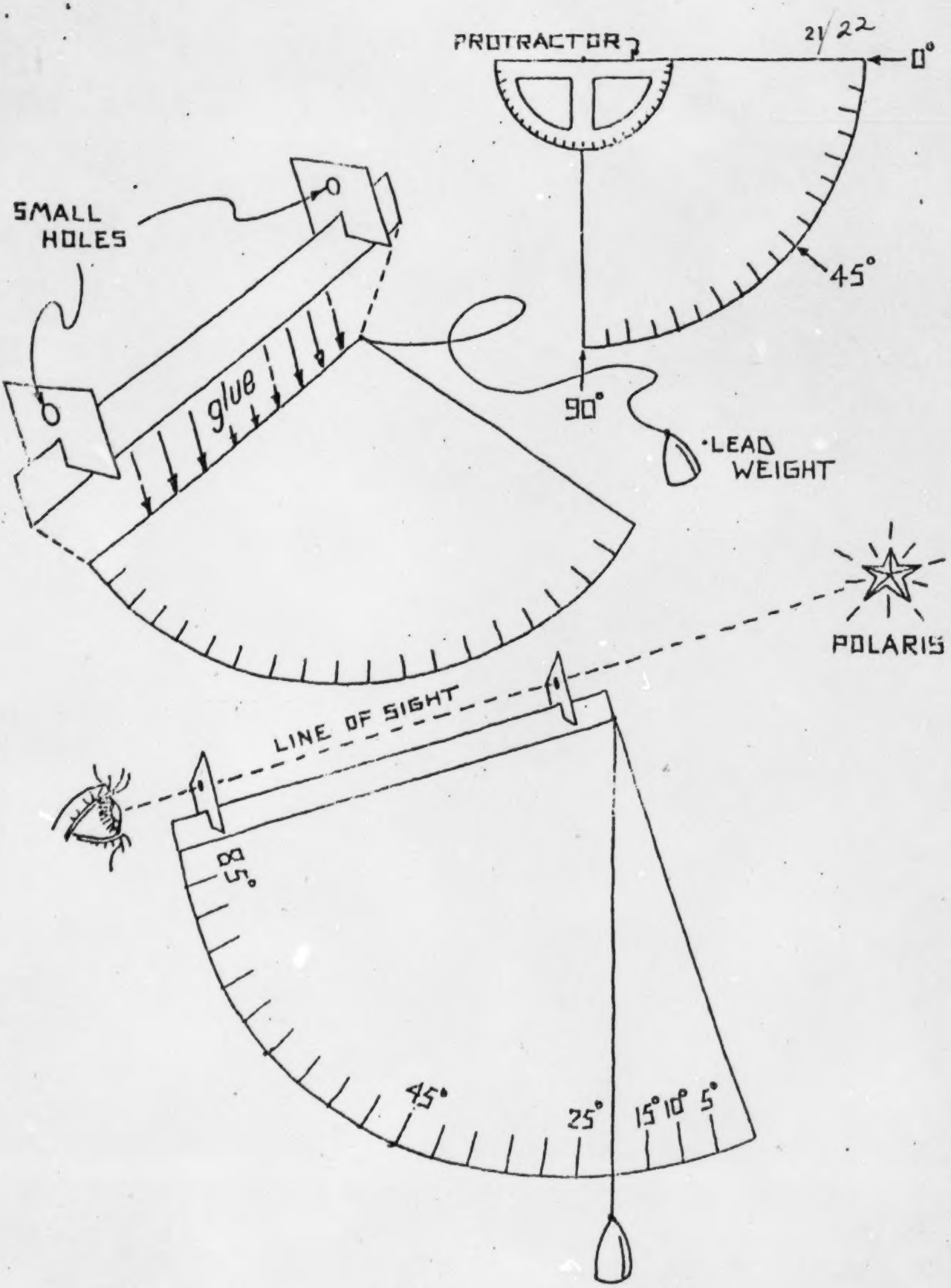
MAINE	POSITION
Fort Kent	47°15'
Presque Isle	46°45'
Millinocket	45°35'
Dexter	45°0'
Eastport	44°55'
Bangor	44°45'
Machias	44°40'
Waterville	43°30'
Augusta	44°13'
Lewiston	44°05'
Rockland	44°0'
Bath	43°50'
Portland	43°30'
Kittery Pt.	43°05'



To Locate the North Star:

Polaris is the first star of the handle of the "Little Dipper" (Ursa Minor) constellation. To locate the North Star, first find the "Big Dipper" (Ursa Major) and use the two stars forming the side of the "pot" as guides toward the "Little Dipper" (as in the diagram). The "Little Dipper" is not always visable when the "Big Dipper" is, but Polaris should be.




PROTRACTOR
21/22
0°
45°
90°
SMALL HOLES
glue
LEAD WEIGHT
POLARIS
LINE OF SIGHT
85°
45°
25°
15°
10°
5°

Lesson IV The British Influence

Distribute Drawing 4

During the 1600's to the early 1900's Great Britain was the strongest naval power in the world. England's merchant fleet traded almost everywhere in the world under the protection of the British Navy. Due to this tremendous shipping ability, Great Britain established colonies around the world including China, India, North America, and Australia. Great Britain's control over the oceans was a necessity since England is an island itself. Since the size of the British Isles was limited, the resources of the country were also severely limited. The ships of the military and merchant fleet were built in such great numbers that the British over-cut their forests and ran out of wood needed to continue expanding the fleets. One of the reasons the United States Navy of 1776 was able to fight the British Navy is that the British could not rely on new back-up reinforcements. In North America, there existed plenty of trees for the lumber to continue ship building.

After the War of 1812, when the United States was recognized as a nation, ships were built in Maine, New Hampshire, and Massachusetts, loaded with lumber and sailed to England. In England, the cargo was first sold, and then the ship that brought it over. The captain and crew then returned to the U.S. as passengers or crew of a merchant vessel and repeated the process.

From 1700-1800 a country could have everything it wanted so long as it controlled the seas of transport. For the British, these items were dominated by gold, copper, silk, spices, tea, and wood.

Some of the early English colonists were the Puritans, who arrived in what is now Plymouth, Massachusetts. These people sought

neither spices nor gold, but freedom to practice their religion. They sailed in a small merchant vessel named the "Mayflower." (Slide 5) The voyage took over 40 days in 1620.

All vessels of the British fleets were sail powered until the 1840's. The earliest steam powered ship to attempt crossing the Atlantic Ocean was the American "Savannah" (1819), but the English spent a great deal of time perfecting the steamship into an average 66 meters in length until 1858, when the "Great Eastern" (Slide 6) was built. The "Great Eastern" was iron hulled and had two paddle wheels, a propeller and 6 masts with sails. She was over 230 meters long! Nothing bigger had ever been put to sea, and nothing bigger was built until 1900. Many U.S. cities were anxious to be the terminal city for the huge ship. One of these cities was Portland, Maine, which built a number of wooden piers for the vessel on the waterfront near the Grand Trunk Railroad. These piers can still be seen, although they are no longer in service. The "Great Eastern" never came to Portland after the piers were built.

Activity

1. Class Trip: Visit the "Mayflower II" at Plymouth Plantation, Massachusetts.
2. Visit the Portland, Maine harbor area, including the shop and street constructions.
3. Meal Plan on Mayflower: The food on the "Mayflower" was typical of food available on most British ships of the period. Create a meal of hardtack (commercially available) and starchy vegetables like potatoes and dried beans. Include salted pork and dried fish. Determine which vitamins are present in such a diet and which are missing. British seamen suffered from a severe gum disease called scurvy which is brought on by lack of vitamin C, such as found in citrus fruits. After this discovery, British ships went to sea with supplies of limes or lime juice. From this they got the nickname "lime juicers" or "limeys."
4. Growing Meal Worms: Meal worms are available from most pet stores that sell live reptiles. These larvae thrive in flour and ground grains. They frequently appeared in supplies of flour and hardtack stored as food for long voyages. By placing live meal worms in a bowl of bran flakes, trace the life cycle of these animals over a period of time. How did they get into the flour and bread supplies aboard ship? Observe over a period of weeks.

Lesson V Piracy and Privateers

During the early years of trade with the New World, large, stout, treasure vessels called galleons would sail for Europe loaded with gold, silver, and jewels from Florida, Mexico and the Caribbean. Galleons bound for Spain, Holland, and France travelled up the coast of North America before beginning the voyage across the Atlantic Ocean. Pirate thieves sailing the coast in wait of these galleons would attack them, steal the treasure on board, and sink the vessel - usually after killing all those on board the unlucky vessel. The stolen treasure was either divided up among the crew or buried along the coast, secure for picking up at a later date.

Pirates are believed to have buried treasure along the U.S. coast from Florida to New England, and into Nova Scotia.

Privateers sailed their own vessels but were employed by the government to raid merchant vessels owned by the enemy. Privateers were often allowed to keep any goods being carried by the captured ship, but the real money came from the sale of the captured vessel by the government. When the captured ship was sold at auction, the privateer responsible received between one-third to one-half the sale money.

During the American Revolution, both the British and U.S. governments employed privateers to destroy the others merchant fleet. British privateers sailed from Canadian ports, notably Halifax, Nova Scotia. (Overhead #5)

The first naval engagement of that war occurred off Machias, Maine, on June 12, 1775, when the privateer sloop "Unity" under the command of Capt. Jeremiah O'Brien, captured the armed British schooner

"Margaretta." The "Unity" was renamed "Machias Liberty" and helped capture another British vessel, the "Diligence," in July of the same year.

Activity

1. If possible, visit Jeremiah O'Brien's gravesite in Machias, Maine.
2. Play: Contact the Acadia Repetory Theatre, 183 Main Street, Bangor, Maine 04401 (207-942-3333) to obtain script of "Ruckus at Machias," a play written about the events leading to the battle between the "Unity" and the "Margaretta." Have students act out parts of the play, or edit and write their own script.
3. Assign a specified amount of money to a limited number of students and auction off the following contents of a captured British merchant ship with the following items:

	General Market Price
15 kegs of molasses (100 litres)	$22 each
20 kegs of black powder (50 kg)	$20 each
1000 kg of lead	½¢/gm
1000 metres of hemp rope	2¢/metre
50 cartons (3 kg) tea	.04¢/gm--normally .12¢/gm--inflated by war
captured ship	$1100 new $600-800 used
Total General Market Value	$11,750

Rules:

a. everything will be auctioned
b. everyone must bid on at least one item
c. the object is to accumulate the most valuable lot of goods for the least money
d. everyone starts with $900.00
e. lots of goods may be broken up (not all of one item needs to be purchased)
f. calculators may be used at teacher discretion
g. assuming the privateer collects 40% of total sales from the ship he captured, have the children calculate his profits
h. students may research items before auction begins
i. winner is the one who accumulates the most value for his/her money

Lesson VI Frigates

Distribute Drawing 6

Frigates were fast naval vessels of the late 18th and early 19th centuries. These ships had lofty sails and one or two decks of cannon. The U.S. "Constitution" also known as "Old Ironsides," is a frigate built in 1797 to defend U.S. merchant vessels in the Mediterranean from pirate attacks. This vessel won her fame in the War of 1812, when she engaged the British frigate H.M.S. "Java" off South America and destroyed it. A British sailor watching his ship's cannonballs bounce off the "Constitution" remarked that the ship's sides must be made of iron, which they were not!

Today, the "Constitution" is on display in the Boston Naval Shipyard and may be boarded for inspection. (Slide 7)

A similar U.S. Frigate, the U.S.S. "Constellation" is on display in Baltimore Harbor.

Activity

Read Oliver Wendall Holmes poem "Old Ironsides," written when the ship was in danger of being scrapped.

The frigate "Constitution" was not saved by the government because of sentimental value. In 1830, the Navy wished to retire the vessel and break it up for salvage. Many Americans became outraged, including a law student named Oliver Wendall Holmes, who wrote this poem arousing popular sentiment for the frigate's preservation.

The ship was not broken up but was converted into living quarters for sailors, and in 1931 was rebuilt as the original frigate with money from penny contributions of school children.

Due to this tremendous effort by students over the years, you may wish to visit the "Constitution" today when you visit Boston.

OLD IRONSIDES

Aye, tear her tattered ensign down!
Long has it waved on high,
And many an eye has danced to see
That banner in the sky;
Beneath it rung the battle shout,
And burst the cannon's roar;--
The meteor of the ocean air
Shall sweep the clouds no more!

Her deck, once red with heroes' blood,
Where knelt the vanquished foe,
When winds were hurrying o'er the flood
And waves were white below,
No more shall feel the victor's tread,
Or know the conquered knee;--
The harpies of the shore shall pluck
The eagle of the sea!

O better that her shattered hulk
Should sink beneath the wave;
Her thunders shook the might deep,
And there should be her grave;
Nail to the mast her holy flag,
Set every threadbare sail,
And give her to the god of storms,--
The lightning and the gale!

by Oliver Wendall Holmes

Lesson VII Whaling Vessels of the 19th Century

Distribute Diagram 7

One of the most important industries of New England during the 1800's was directed to hunting whales and producing whale oil as a fuel and lubricant. Other products of the whales were used for perfumes and skirt hoops. The whaling fleets sailed out of New Bedford, Mass.; Mystic, Conn.; Portsmouth, N.H.; Portland, Me.; and Nantucket Island among the many coastal ports. Voyages were often three years long and the work dangerous and dirty. Often whaleships disappeared without a trace in the Atlantic or Pacific Oceans. When a ship returned successfully, the owners and crew would divide many thousands of dollars in profits.

Whaleships were generally around 37 meters long and had many different sail riggings. Each ship was equipped with 4 or 6 whale boats which were lowered to chase and capture the prey. Each of these boats had to be rowed by a crew under the direction of the harpooner (a harpoon is a sharp, barbed spear which was attached to a rope). Dead whales were towed back to the ship where the fatty blubber was removed and boiled down into oil. The ship's carpenter was kept busy building oil kegs and repairing whaleboats. (Slide 8)

The whaling industry began to die out in New England with the discovery of underground petroleum in Pennsylvania in the late 1800's. The last whaling voyage from New England lasted only two days when the bark "Wanderer," sailed from New Bedford, only to be wrecked in a storm on Cuttyhunk Island in 1925.

There is only one remaining whaleship from the New England fleets in existence, the "Charles W. Morgan," which is on display in Mystic; Conn. (Slide 9)

During the long voyages, sailors would carve designs or scratch pictures into whalebone as a pastime. This is known as scrimshaw. Usually scrimshaw pictures were of what was available to sketch; we therefore have a good idea of what a sailor thought of and appreciated most during those years at sea. Often pictures were of other ships, sailors, or the wives left back at port. Today, scrimshaw items are very valuable.

Activities

1. Since whales are protected by U.S. law, new whalebone and whale products are not permitted into the country. Children may make some similar scrimshaw items, under supervision, by the following process:
   a. Thoroughly wash and clean smooth beef bones (ribs are good).
   b. Soak the bone in chlorine bleach for a half-hour to bleach and disinfect it. Rinse off.
   c. After the bone dries, lightly sand it with fine sandpaper in the direction of the grain.
   d. With a pencil, sketch a nautical scene on the bone.
   e. Using an artist's scribe or a sharpened nail, scratch the desired image onto the surface of the bone. Wear safety goggles and one glove for protection during this procedure.
   f. Rub over the scratched image with charcoal or kerosene lamp-black to color in the lines. The black should wipe off the unscratched surface of the bone.

This project can also be done with the inside surface of hard shell clams (Quohogs) or with plaster of paris, as follows:

· Mix plaster of paris with water. Drop small spoonsfull on wax paper. When sufficiently hardened, remove from paper. These will be fairly round. Use nail to sketch design--ship,whale, etc. If a pendant is desired, carefully make small hole at top with nail. Use fine brush and black tempera paint to paint over lines of design. Rub firmly but carefully over entire piece to smear paint. String yarn through hole for hanging.

2. Check with the local historical society concerning burial sites of whaling captains. Some communities (Sag Harbor, L.I., for instance) have monuments in the cemetaries dedicated to crews lost on voyages or killed by whales.

3. Utilizing either of the two suggested resources or one of your own, obtain the measured dimensions of a typical whaling vessel. Have the class transfer the deck plan to graph paper, then outline the image of the deck plan on the school playground with string and stakes, or lime (the kind used in marking athletic fields), using the graph paper as a reference.

Plan resources: Howard Chappelle, American Sailing Ships, Norton Press, 1935 (Bonanza Reprint)

Albert Cook Church, Whale Ships and Whaling, Norton Press, 1938 (Bonanza Reprint)

4. Show sound filmstrip,"Folksongs and Whaling, Parts I and II." Warren Schloat Productions, 1970.

Lesson VIII Clipper Ships

Distribute Drawing 8

Clippers were the fastest sailing ships to ever enter merchant service. They sped across the oceans from New York and Liverpool, to India and China, carrying back tea, spices and silk. The market prices for these goods were highest for those shippers who could supply them fastest, thus, the quest for speed.

This design of ship was invented and built by Donald McKay, of Nova Scotia. His ships bore names suggestive of speed and greatness, such as "Flying Cloud," "Lighting," "Nightingale," "Ariel" and "Black Prince." The last clipper ship built was the "Glory of the Seas," in 1858. (Slide 10)

Clippers featured large, square rigged sails, and tall, sharp, bows and sterns. (Slide 11) This shape helped the ship plunge through the seas, and cargo space was sacrificed to streamline the vessel. Because clippers were built for speed, their masters pushed them to the limits of their designs; sometimes a ship would plunge into a large wave at high speed and never come to the surface again.

Clipper ships remained in service for speed until steamships proved more reliable. While clippers sometimes could move at speeds of 19 knots (35 km/hr), which was faster than steamships of the day, steamships did not slow down when the wind died.

These proud, beautiful "Greyhounds of the Sea" ended their days as barges, hauling fertilizer from Africa to Europe.

The last clipper ship in existance is the "Cutty Sark" in England (70 m x 12 m).

Activities

1. Sewing Canvas: Obtain sail quality canvas from commercial suppliers (listed in the Yellow Pages) for practice stitching by students. Students will require thick needles and coarse, waxed twine to overlap layers of canvas. Sailmakers used a leather mitt with a horn, ivory, or hardened resin button in the palm of it to shove through the needle.

2. Weighing Canvas: Have the children weigh 10 cm^2 of sail canvas on a pan balance. Estimate the weight of a square meter of canvas. Estimate the weight of 100 m^2 of sail canvas. How about its weight when wet with a wind blowing into it, and the deck angled at 40^o?

3. Heave Away!: Have the children rig a block and tackle in either the gym or the school yard. Determine the weight of a large sail or piece of cargo, and equal it in small available mass, such as 4 or 5 cinderblocks. Have several children attempt to hoist the load 3 meters off the ground without dropping it. Try different pulley arrangements to demonstrate different mechanical advantages.

   Try it with this sea chanty. Designate one child as the leader. He says (or sings) the verse and the group does not expend effort. When the chorus (accented) comes around, all participants repeat it in time and pull on the rope. This is known as a halyard chanty, the name coming from the halyard ropes used to raise sails.

Leader: Cape Cod girls they have no combs!
All: 'heave away, haul away' (effort on each saying) (2x)
Leader: They comb their hair with codfish bones!
All: 'and we're bound for Australia' (1x)

Leader: Cape Cod boys, they have no sleds!
All: 'heave away, haul away'
Leader: They slide down hills on codfish heads!
All: 'and we're bound for Australia'

Leader: Around the Cape in frost and snow
All: 'heave away, haul away'
Leader: Around the Cape we all must go!
All: 'for we're bound for Australia'

Leader: Yes, my boys we're all at lee!
All: 'heave away, haul away'
Leader: We'll soon be far away at sea!
All: 'and we're bound for Australia'

Leader: I wish to gosh I'd never been born
All: 'heave away, haul away'
Leader: To go a ramblin' round Cape Horn
All: 'and we're bound for Australia'

Leader: One more pull and that'll do
All: 'heave away, haul away'
Leader: We're the boys to see her through
All: 'and we're bound for Australia'

There are other types of sea chanties. One is a capstan chanty used by men circling a rotary capstan such as used to raise anchors. Probably the most famous capstan chanty is "Blow the Man Down."

Sea chanties were sung to help get work done. Generally, they abounded on sailing vessels where muscles were the only reliable sources of power for getting work accomplished. Sea chanties never were sung aboard military or naval vessels.

The purpose of a sea chanty was to organize the labor needed to perform a group task into one concerted effort.

One man (presumably the one who knew the most verses) was assigned to sing the lead in, while everyone joined in the choruses. Even the toughest sailors who lived took part in this because it didn't require any vocal skill other than to repeat a chorus and pull for all he was worth.

We tend to think of sea chanties as gay, light songs, fast paced with the spray of the clipper winging along at 19 knots. Not so. Chanties tended to be slow and paced with the speed of the back breaking labor. Sailors also often tended to show up on board the first day out with miserable hangovers or recovering from a fight in port. As a result, sea chanties ramble and are dischordant. For instance the first verse of "Blow the Man Down"

Leader: As I was a walkin' down Paradise Street
All: To me way, hay, blow the man down

should require at least 15 seconds to repeat assuming the sailors are bent over a capstan, walking in a circle, and raising a 1500 pound anchor.

Lesson IX Downeast Schooners and Other Sailing Vessels

Distribute Drawing 9

The coasts of Maine, New Hampshire, and Massachusetts remained the greatest producers of sailing ships in the world, due to the abundance of lumber. The sailing vessels built on the coast were designed to carry freight--lots of it--around the world or up and down the U.S. coast. Downeasters had greater cargo space than clippers due to their long, boxy hulls. These vessels were not designed for speed, but to move freight cheaply and in great volume.

Schooners and ships were commonly built with 3, 4, 5, and 6 masts. (Slide 12) Only one ship, the iron hulled "Thomas W. Lawson," was built with seven masts. (Slide 13) The size of the "Lawson," 135 m x 17 m, was her undoing, as she proved too big to turn in a breeze and was finally lost in a storm off England.

Schooners from Bath, and Searsport, Maine continued to be built until the end of World War I. Some were sent to Florida to move supplies in when that state was developing, many were burned or sunk, some just abandoned. Today, the remains of the "Luther Little" and the "Hesper" can be seen in Wiscasset, Maine. The hulk of the 5 master, "Cora A. Cressey" rests in Bremen, Maine (Slide 14) while other hulks can be seen in Boothbay, and Frankfort, Maine. These are representative of all that remain of the hundreds of ships born along this coast.

There are still a few sailing ships afloat as museum pieces in New York, Philadelphia, and San Francisco, to name a few places, and while these ships are mostly of European origin, they still bear the designs and dimensions of the Yankee Downeaster.

Class Trips

1. Visit the Bath Marine Museum in Bath, Maine.

   This includes the Percy and Small Shipyard where vessels like the "Cora Cressy" were built.

2. Visit the Penobscot Marine Museum in Searsport, Maine.

   This includes sea captain's homes, models, and hundreds of artifacts. (207-548-6634)

3. Visit the "Hesper" and "Luther Little" in Wiscasset, Maine.

   These two crumbling vessels still convey the impression of greatness and are situated less than a hundred meters off the town pier.

Lesson X About Sails and Rigging

Distribute Drawing 10

Not all sailing vessels were rigged in the same manner. As we have learned, specific sailing ships were designed for specific purposes, be it a Clipper ship, freighting Downeaster, or whaler.

On sailing vessels, the first mast nearest the bow is the fore mast. The mast or masts following are the main masts. The last mast on a vessel is the mizzen mast.

Sail plans can designate over thirty separate sails on a single vessel, but we can classify sailing vessels by the mast and yard arrangement (a yard is the wooden crosspiece from which sails hang on a mast). There are two major types of sail plans; square rigs and schooner rigs. Square rigs are four-sided canvases (though not always exactly square), schooner rigs are large triangular canvases. The combinations of these rigs as they are hung from the masts determine the type of ship.

Not all sailing vessels were "ships." Ship rigging implies that three or more masts must all be square rigged. Two masted vessels with square rigging are called brigs. A vessel with at least three masts, the fore and main masts square rigged, and the mizzen mast schooner rigged, is a bark. Vessels with at least two masts, all of them schooner rigged, are simply schooners no matter how large.

While not all sailing vessels or steam powered vessels are ship rigged, we still use this term "ship" to identify most large boats as a convenience.

Activity

Equip blocks of wood with various sail arrangements similar to those pictured in Figure 10.* Compare how these riggings might be used on different size vessels for speed and manuverability. Try modifying the blocks or wood for speed and stability. Why must the keel (bottom) be weighted when wind catches the sails? This is called ballasting. Sailing ships would carry granite ballast to prevent capsizing.

Try rigging sails to roller skates and use an electric fan as a wind source.

Lengthy schooners, like the 7 masted "Thomas W. Lawson," had difficulty turning in a breeze due to an inability to shift their huge bulks across a wind stream. This is called "hanging in a turn." Remember, only one 7 masted schooner was ever built. Could this have been a factor? Would this affect a ship like the "Great Eastern"? Why not? Is this true of all self-propelled vessels?

*Also, refer to text--Ship Models and How to Build Them by Harvey Weiss for practical building suggestions. Of particular interest is the simple sailing model in Chapter 2. (See Bibliography)

Lesson XI Fishing Vessels Under Sail Off the New England Coast

Friendship Sloops The Friendship Sloop was designed as a work boat for one, two, or three men, around 1897, in Friendship, Maine. (Slide 15) In the days before engined boats were available to fishermen, the fleets relied on the wind in their sails to get around. This boat was built to be wide for stability on the ocean and to hold plenty of cargo. Friendship sloops had deep keels so plenty of sail could be carried aloft without endangering the boat's stability. Small Friendships could be handled by one lobsterman, handling the rudder and sails from one area of the boat. When he was finished fishing for the day, the large sails got him to port quickly and safely. Friendship Sloops were capable of joining the fishing fleets on the Grand Banks of Newfoundland, miles out on the Atlantic.

Today, these sturdy little crafts are still built with engines as well as sail, as pleasure crafts, not fishing boats. Hundreds of the fast vessels meet each year in the Gulf of Maine off Friendship to race against each other.

Grand Banks Dory Schooners Until the development of fully powered fishing trawlers, fishermen used to sail out to the Grand Banks of Newfoundland in pursuit of herring in two masted schooners called "salt bankers." These vessels were about 44 meters long and had enormous holds where fish were salted and iced to preserve it during the voyage. There was no refrigeration in those days. (Slides 16, 17)

Periodically, these vessels, both American and Canadian, would race over complex courses in the Gulf of Maine for enjoyment. Each

season as the fleets gathered on the fishing grounds, strong, old friendships were renewed among the sailors and owners.

There are a few of these vessels in museums in Maine and Nova Scotia. The rest having been scrapped or lost at sea thirty years ago. The most famous "salt-banker" was the schooner "Bluenose," out of Lunenburg, Nova Scotia. This vessel's image appears on the Canadian dime.

Distribute Drawing 11

Activity

1. Read Captains Courageous by Rudyard Kipling.
2. Visit a shipyard where Friendship Sloops are built. Contact the Friendship Sloop Society, Friendship, Maine 04547.
3. Visit the "Sherman Zwicker," a Grand Banks Salt Banker in Boothbay, Maine.
4. Identify by sight the commercially important fish of the Atlantic region. (Contact your local Marine Advisory or Cooperative Extension Agent. Also write to N.OA.A., National Sea Grant, Washington, D.C. 20402 for information on fish posters.)
5. Weather Lore: Predicting the weather while at sea has always been of major importance to mariners. Over the years, sayings, almost a form of poetry, have been handed down from one generation of sailors to another for use in predicting the weather. Try these sayings as they apply to the weather in your area and see if they hold true most of the time.

SAYING	MEANING
a. Wild Geese, Wild Geese, Gangin' Out to Sea All fine weather It will be.	Sea birds, like geese and gulls, tend to come inland when a storm is brewing or coming at sea. They return to the feeding grounds or migration paths only when there is clear weather expected for an extended period of time.
b. Red Sky at morning, Sailor take warning, Red Sky at night, Sailor's delight.	Red sunsets generally predict fair, calm weather for the following day. Red sunrises generally herald a coming change for the worse in the day's weather.
c. Mackeral Skies and Mare's Tails Make tall ships Carry low sails	Mackeral skys are alto cirrus clouds and mare's tails are currus clouds. These formations herald thunder-storms, wind and rain.
d. If clouds look as if Scratched by a hen, Get ready to reef your topsails then.	Cirrus clouds, or a streaked sky indicates high winds and showers.

6. Construct a crude barometer:

   a. Seal off a narrow glass tube at one end by either melting it over a bunsen burner or using a permanent cement.

   b. Fill the tube with colored liquid except for about 3-4 cm of air.

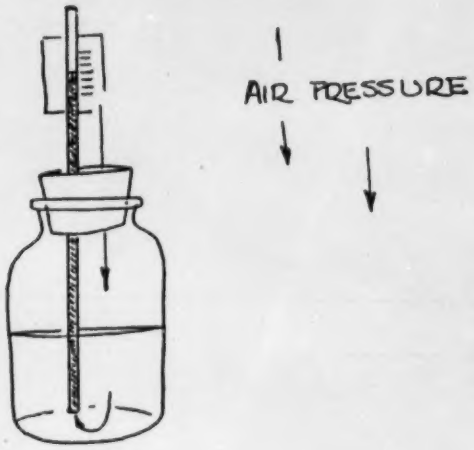
   c. Run the tube through one hole of a two hole stopper so the closed end will be above the stopper when it is used to seal a bottle.

   d. Fill a bottle halfway with the same colored liquid and insert the stopper in the neck. The open end of the glass tube should be below the level of the liquid in the bottle. The air in the tube should be at the closed end of the tube. The second stopper hole should not be sealed at all.

   e. Use rubber cement to attach a card with a line marking the water level in the closed tube.

f. Barometers can be read daily.

The final instrument should look like this:



How it works: Air pressure changes with humidity and temperature. This is called barometric pressure. As barometric pressure increases, air pressure pushes down on the liquid in the bottle through the open hole in the stopper. Because the glass tube is closed off, air pressure does not push down on the liquid in that tube. The liquid in the bottle is forced up the glass tube through the opening in the bottom, raising the level of the liquid in the tube. The greater the barometric pressure, the higher the level. As barometric pressure lessens, the level of liquid in the glass tube drops. Try these sayings with your barometer:

a. When the glass falls low
Prepare for a blow;
When it rises high,
Let your kites fly!

b. Long foretold, long last,
Short notice, soon past,
Quick rise after low
Sure sign of a stronger blow.

Lesson XII Coastal Steamers

Distribute Drawings 12, 13

Luxurious steamboats once operated from New Hampshire and Maine to Boston and New York carrying freight, mail, and tourists quickly and conveniently along the coast.

Boats were named after coastal towns or famous New England personalities, or images. Steamboats were powered either with propellers or paddle wheels. On paddle wheel ships, steam cylinders were linked to the wheel by a lever and two long bars called a walking beam. When the engine was in motion, the walking beam appeared to be stepping up and down on the ship's deck like a pair of legs might. (Slide 18)

Propeller driven ships did not have walking beams as all the machinery was contained within the hull. (Slide 19)

Coastal steamboats were usually painted white and gold with elegant wood carvings on the superstructures and in the public rooms inside. They had several decks on top of each other to facilitate observation and many cabins lined the railings. There were dining rooms and large ballrooms. The pilothouse was situated on the "hurricane deck."

Too often, sparks from the engines would set the wooden superstructures ablaze and many people would be killed. Many steamships ended their careers in this fashion.

The coastal steamers began to fade away as the automobile became popular and roads improved. The last New England coastal steamers stopped running on the eve of World War II. They never came back into use after the war.

Activity

Building a Model Walking Beam Engine

Share the slide of the coastal steamer "State of Maine" with the children. (Slide 18) Point out the walking beam structure.

Using the enclosed outline and the assembling instructions (Figure 13), children can build a two dimensional functioning model of this engine. Shirt cardboard, white glue, scissors and paper fasteners are all the supplies needed. All measurements should duplicate those on Figure 13.

Class Trip

1. Visit the Shelburne Museum in Shelburne, Vermont where a lake steamer similar to a coastal boat is on display.
2. Ride the Lake Winnipesaukee, N.H. sight-seeing boat "Mount Washington." This is smaller than a coastal boat, and not as luxurious, but reminescent of the type.

Lesson XIII Coastal Fishing Boats Today

Most fishing boats today are powered by gasoline or diesel engines. Probably the most familiar boat used on the New England coast today is the lobster boat. Lobster boats feature long, low work areas and a tall bow to prevent water from washing over the decks and swamping the boat. Some lobster boats have a small sail over the stern which does not provide power, but keeps the boat pointed into the wind during rough weather. Most lobster boats have hulls which are widest below the waterline to help prevent rolling between waves.

Other common fishing boats in Northern New England are the herring seiners and sardine carriers which provide most of the U.S. supply of these valuable ocean foods. These powered vessels feature large, deep holds for fish (similar to the old salt bankers) and an engine room with pilot house on deck. Many of these vessels now have cranes and machinery aboard to lighten the labor once done entirely by men. Some herring boats round the fish into a bowl shaped net and use a suction hose to lift them into the hold. The fish are either brought back iced in the hold or cleaned and prepared for packing on board ship. (Slide 21)

Filmstrip: The Maine Sardine Council, P.O. Box 337, Brewer, Maine 04412, will provide a free filmstrip on request called Maine Sardines--The Food and the Industry. A teacher's narrating booklet is included. Previewing this filmstrip is suggested due to some dating and stereotyping.

Activity

1. Build a model lobster trap out of popsicle sticks and string or wire. Any photograph can serve as a model (ref. to Finestkind O' Day by Bruce MacMillan). How does a lobster trap work? How does the lobster help it work?
2. Adventurous students may wish to try eating sardines out of the can in the classroom.
3. List commercially harvested seafoods other than finned fishes. Include scallops, lobsters, crabs, squid. Report on methods of harvesting these foods.
4. Visit a cannery (contact the Maine Sardine Council at the address on the previous page).
5. In the first six months of 1977, American catches have increased by 50%. Some people feel this is due to the 200 mile limit for foreign fishermen. Which countries does this law affect? What is your opinion of the 200 mile limit. Write an essay. Invite several speakers.
6. Chart the area encompassed by the 200 mile limit on an East Coast map.
7. Fishermen often fish in the vicinities of shipwrecks like the sunken liner "Andrea Doria." The "Andrea Doria" sank at position 40^{o} 29' N x 69^{o} 50' W. Locate this on the map. The Navy regularly sinks old ships, buses, railroad cars and hundreds of old tires on purpose so fish will inhabit them and breed. While this sounds like littering, it is really very helpful for sea creatures. Can you explain why? What will become of these "artificial reefs" over the years? Is this littering? Write a defense or prosecution of this program. Stage a debate.

ENRICHMENT ACTIVITIES

Sketches or Paintings

Have the students try sketching with pencil or painting with water paints some sailing vessels. (This could be made into a display for the bulletin board.)

Make a Ship

Children may wish to build ship models out of wood strips, cardboard, soap, clay etc. For plans refer to American Sailing Craft, by H.I. Chappelle

Poetry

Have children read a particularly pleasing or expressive poem about the ocean. Share some poems you have found with the class. Offer to allow children to share their verses. Remember, poetry is extremely personal to many people and should not be forced for oral reading.

Monologue

Have each child choose a ship type studied in connection with social studies and report something about the people using that type of vessel, duration of voyages, hardships, speed, preserved ships of that type, famous crossings. Read old newspaper copies or microfilm.

Field Trip

Visit the U.S.S. Constitution in the Boston Naval Yard. Take a boat trip on one of the numerous Maine and New Hampshire coastal or lake ferries. These are marked on most road maps. Information is available through the ALA.

Map Work

Have students draw or construct a New England map showing principal ship building sites past and present. Identify the types of boats built on those sites and the ports they sail (or sailed) from.

MARITIME WORD MAZE

H	A	L	Y	A	R	D	S	D	O	A	P	Q	G
Y	E	L	L	A	G	S	M	R	L	T	I	C	P
D	V	C	M	O	H	T	A	F	U	T	H	Y	K
R	F	X	B	N	L	B	I	F	R	A	S	E	F
A	O	C	O	I	I	J	O	O	N	A	E	Z	G
O	R	K	W	G	N	R	P	T	I	L	F	K	G
B	E	W	S	B	E	N	E	S	O	H	L	G	N
R	C	D	P	K	S	Y	A	A	E	U	H	I	I
A	A	Y	R	P	M	H	O	C	A	J	B	K	E
T	S	F	I	R	O	V	E	C	L	A	C	X	G
S	T	O	T	L	L	S	N	E	C	E	A	D	I
W	L	L	D	U	T	Z	B	H	T	O	N	K	R
R	E	N	O	O	H	C	S	J	I	S	V	E	F

AFT
BINNACLE
CABIN
BOWSPRIT
CAST OFF
CAULK
CHANTEY
FATHOM
FORE
FORECASTLE
GALLEY
HALYARDS
HOLD
KEEL
KNOT
LINES
PORT
RIG
SCHOONER
SHEETS
SHIP
STARBOARD

Courtesy of Mr. Clayton Carkin, Freeport, Maine.

The follwing evaluation activity may be used as a "BINGO" type game, or as a "total-score" game. If used as a "total-score" game, the class is divided into two or more groups. Each student has a turn and must pick one question from any category of her/his choice. A correct answer earns the agreed upon points and qualifies the student for the bonus question. The group with the highest number of points is the winner.

C O A S T

Classification

1.	Identify ship #1	Bonus ID 10--Friendship Sloop
2.	Identify ship #2	Bonus ID 1--Ship
3.	Identify ship #3	Bonus ID 2--Bark
4.	Identify ship #4	Bonus ID 3--Barkentine
5.	Identify ship #5	Bonus ID 9--Lobsterboat
6.	Identify ship #6	Bonus ID 4--Brig
7.	Identify ship #7	Bonus ID 5--Brigentine
8.	Identify ship #8	Bonus ID 6--Hermadrophite Brig
9.	Identify ship #9	Bonus ID 7--Top Sail Schooner
10.	Identify ship #10	Bonus ID 8--3 Masted Schooner

VOCABULARY

DEFINE

1. What is an opening in the deck? (hatch)

Bonus 1--What is the name of one who steers a vessel? (helmsman)

2. What is the body of a ship? (hull)

Bonus 2--What is the backbone of a ship? (keel)

3. What is the aftermost part of a vessel? (stern)

Bonus 3--What word is used for storing or putting away? (stow)

4. What is the lever attached to the rudder to steer the ship? (tiller)

Bonus 4--What is the name for a weight to keep a ship from moving? (anchor)

5. What word means not able to move from a lack of wind? (becalmed)

Bonus 5--Give the word meaning to measure the depth of H_2O? (sound)

6. Maine Mast

Bonus 6--Portside

7. Navigate

Bonus 7--Bow

8. Rig

Bonus 8--Points--deck

9. Caulk

Bonus 9--Chanderlerly

10. Dory

Bonus 10--Yard

SLOOPS, COASTAL STEAMERS AND FISHING VESSELS

1. What is the name for the sailboat designed in Friendship, Maine in 1897? (Friendship Sloop)

2. What were the two important features of a Friendship Sloop? (a. wide for stability, b. to hold plenty of cargo, c. it has a deep keel)

3. Where were Friendship Sloops now able to fish? (Grand Banks of Newfoundland)

4. In yesteryear, F. Sloops were used for fishing, now-a-days how are they used? (pleasure crafts and racing)

5. Why was there such enormous holds in the Grand Banks Dory Schooner? (to store and salt fish to be preserved during a long voyage)

6. What is the name of the most famous salt banker that is also on the back of a Canadian dime? (Bluenose)

7. How were coastal steamers two-way powered? (by propellers or paddle wheels)

8. What was the cause of the decline of Coastal Steamers? (popularity of automobiles)

9. Most modern fishing boats are powered by what? (by gas or diesel engines)

Bonus--What is the most familiar coastal boat today? (lobsterboat)

10. What put schooners out of business? (the increased use of railroads)

SCHOONER AND CLIPPER

1. Name the best known Clipper Ship? (Cutty Sark)

Bonus 1--What made them so important? (speed)

2. Name two important products transported by Clippers?

(tea, spices, silk, gold)

3. Name three Clipper ships other than Cutty Sark? (Ariel, Black Price, Glory of the Seas, Flying Cloud, Lightening, Nightingale)

Bonus 3--Were they square or schooner rigged? (square)

4. Who was the first person to design a Clipper Ship? (Donald McKay)

Bonus 4--Where was he from? (Nova Scotia)

5. Why did the Clipper Ships die out? (steamships took over)

Bonus 5--Why were steamships more dependable? (they could continue moving without wind power)

6. What are the major differences between Clippers and Schooners?

(Schooner--carried great amount of cargo
Clipper--speedy delivery of cargo)

Bonus 6--What kind of ship is the Thomas A. Larson? (7 masted down-east schooner)

7. Name two towns in Maine where schooners were built? (any two coastal)

Bonus 7--Point why were so many built in Maine? (wood is a natural resource)

8. Why do you think the Thomas Lawson sank?

(because it was too big--too many masts to turn in a breeze)

9. What is the purpose of a sea chanty?

(to help get work done and organize labor)

Bonus 4--Were chanties fast or slow and why?

(they were slow due to doing hard labor)

10. What are the names of the two famous Downeast Schooners that were abandoned just up the coast? (Luther Little and Hesper)

Bonus 2--What town can they be seen at? (Wiscasset)

TRIBEST RIVERS

1. All Indians of Maine are part of what Indian nation? (Algonquin)

2. What is the largest river in the State of Maine? (Penobscot)

3. What is the name of the river system that is closest to Freeport? (Androscoggin)

4. What is the name of the Indian tribe that lived along the Saco River? (Sokokis Indians)

5. What river has its origin from the largest lake in Maine: Moosehead Lake? (Kennebec River)

6. Most major cities in Maine have developed from the results of the rivers what? (waterfall)

7. Why are most rivers in the State of Maine bad for canoeing? (because of waterfalls)

8. What are the two major Indian tribes of Northern and Eastern Maine that have Indian claims to the land? (Penobscot and Passamaquoddy)

9. What river in northern Maine forms a natural bounding line that separates U.S. and Canada? (St. John)

10. What mighty tribe lived in the river valleys of the Androscoggin and Kennebec? (Abnaki)

VIKING, PRIVATEERS, WHALING

1. Where did the Vikings originally come from? (two European countries)

   (Norway and Sweden)

Bonus (1 pt.)--What was another name for the Vikings? (Norsemen)

2. What is the name for the letters or characters carved into the stones by them? (Runic characters)

Bonus (2 pts.)--What does the discovery of a Runic stone mean?

   (that they were here before the Vikings)

3. What is the name for a wooden Viking ship? ("longship")

Bonus (3 pts.)--How was it powered? (men rowing--sails)

Triple Bonus (5 pts.)--When did they first land on North America?

   (Year 1000)

4. What was a privateer? (a ship's crew hired by the government to raid merchant vessels owned by the enemy)

Bonus 4--How were these men paid? (by the auctioning of the captured vessel and its contents)

5. What is important about the "Unity" and "Margaretta"? (The privateer sloop "Unity" (captain Jeremiah O'Brien) captured the armed British schooner "Margaretta off Machias, Maine in 1775)

6. What is the difference between the action of a pirate vessel and a privateer upon the capture of a merchant ship?

   (The pirates would attack the merchant vessels, steal the treasure, sink the vessel and kill all those on board. The privateer would capture the merchant vessel, probably spare the crew, and auction off the vessel and contents.)

7. What was one of the most important industries of New England in the 19th century. (Whaling)

Bonus (5 pts.)--What was unusual about one of Maine's whaling voyages?
(David Densmore formed the Bath Whaling Company and outfitted the whaler Massasoit through the guidance of a spirit voice.)

8. What was the cause of the decline of whaling?
(The discovery of oil on land)

Bonus (5 pts.)--Explain scrimshaw.
(Sketched and inked pictures of whaling done on whale bone or teeth)

9. Explain the differences between: harpoon, lance, tryworks.
(Harpoon--used to hit and weaken whale
Lance--used to kill a whale
Tryworks--used to boil out oil from a whale's blubber)

10. Who was the Charles W. Morgan?
(The last remaining whaleship from New England)

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